Wisconsin
Department of Commerce

ENVIRONMENTAL & REGULATORY SERVICES DIVISION
Bureau of Storage Tank Regulation
P. O. Box 7837
Madison, Wisconsin 53707-7837

Program Letter
Division of Environmental and Regulatory Services
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Design Criteria for Process Equipment Buildings Associated With Environmental Remediation of UST/AST Sites

As a response to several fires and explosions in 1992 and 1993 involving buildings housing remediation equipment, the department issued an ILHR 10 Position Statement and Commentary to address fire safety and construction practice concerns. This program letter is intended to include and update the initial positions of the department, as well as establish guidelines addressing new issues.

Issue

Soil and groundwater contamination remediation practices include several processes that involve the potential fire hazards from flammable or combustible liquids and associated vapors. The equipment associated with these processes often are protected from the weather elements or tampering by enclosure within a structure. Unfortunately the structure may also serve to trap vapors, posing a fire and life-threatening hazard.

Presently, this type of facility escapes direct code application due to the unique nature and limited application. The building code does not clearly identify this type of structure and its respective use within the scope of individual chapters. This type of facility is not addressed by national standards, as well. Design criteria is subject to individual interpretation and discretion. The state has experienced approximately six fires or explosions within buildings of this type in 1991 and 1992. Representatives of firms designing and constructing remediation facilities had requested guidance in the applicable rules and fire prevention measures.

The Department implemented a workgroup to address the use and hazards associated with buildings enclosing remediation equipment and the associated processes. The workgroup determined that *pump and treat*, *vacuum pumping*, and *free product removal* processes pose a significant fire/explosion risk due to the existence of flammable and combustible liquids and fumes or vapors. It was also determined that these facilities have very similar characteristics, therefore making a single design standard applicable to all three processes. In May 1993 the Department issued the original program letter and a few months later an addendum.

NFPA 30 Chapter 5 – Operations, addresses building (facility) components dependent upon the handling and use of flammable/combustible liquids being a primary activity or incidental to the primary activity. Buildings housing remediation equipment appear to fall between the two. The workgroup evaluated the physical characteristics of the equipment and the operating and maintenance practices associated with the respective processes. The design recommendations are based upon requirements within the Wisconsin Administrative Codes and national standards: Comm 50-64, ILHR 10, and NEC NFPA 70. The building and its operation meet the definition of process in NFPA 30 Chapter 5 – Operations. The facility design standard Chapter 5-3 is used to establish the basic criteria for the remediation building. Chapter 5 is written with a focus on the storage and handling environment associated with industrial and processing plants. Due to limited size and scope of processes, respective remediation activities, product storage,

and the reduced degree of risk found in the subject remediation buildings, some of the requirements of NFPA 30 Chapter 5 are not practical.

Scope

The application of this program letter is intended to address remediation sites that collect a liquid product which has a Class I flammable or Class II or IIIA combustible liquid characteristic. Classification is distinguished by the product's flashpoint. A product with a flashpoint 200°F or greater is not presently regulated. Under normal conditions groundwater holding tanks, condensate tanks or filter tanks would not be expected to exhibit flammable or combustible liquid characteristics.

The focus of this program letter is based upon some assumptions:

- Remediation buildings are designed to be temporary structures with an expected use life of 1 to 5 years.
- The facility is designed and constructed for the sole purpose of enclosing remediation equipment for the term of the remediation project.
- The process equipment is designed, constructed and installed by an engineer using good engineering practices.
- The storage of a flammable or combustible liquid is short term and the result of the remediation segregation and collection process.

Design Criteria

Setback

(A) NFPA 30-5-3.2 (1996 Edition) and Table 5-3.2.1 address the *process vessel*. In the remediation application the process vessel is the flammable/combustible liquid collection tank. Tanks $\leq$ 275 gallon capacity must be located 5 feet from the property line and 5' from any public way or important building. Tanks 276 to 750 gallon capacity must be located at least 10' from the property line and 5' from a public way and/or nearest important building on the same property.

(B) NFPA 30-5-3.2.3 requires that liquid processing equipment such as pumps, heaters, filters, exchangers, etc. shall not be located closer than 25' to a property line that can be built upon, or to the nearest building. The belief is that such equipment is more prone to leakage than the process or storage tank. This spacing requirement may be waived where exposures are protected by a blank wall having a fire resistive rating of not less than 4 hours.

(C) Typically, the remediation building contains the liquid processing equipment and the process vessel, when there is one. The most restrictive setback of 25' shall apply.

(D) NFPA 30-5-3.2.1 also allows the setbacks to be determined by an engineering evaluation of the process, followed by application of sound fire protection and process engineering principles. The standard does not elaborate.

The setback measurement is from the vessel or the equipment, not from the building. The setback is intended to protect property (exposures) belonging to another owner. If the wall facing the exposure is a blank wall of *not less than 2 hr. fir*e rating, *distances greater than 25* from the property line or important building on same property may be waived. If the wall facing the exposure is a blank wall

	of *not less than 4 hr. fir*e rating, distance requirements may be waived. If the wall of the nearest building on the same property is a blank wall with a 4 hr. fire rating, the distance requirements may be waived (by the Department) between the remediation building and the important building.
Building construction	NFPA 30-5-3.3 Process buildings or structures shall be of fire-resistive or noncombustible construction. NFPA 30-5-3.2.2 requires that where Class IA liquids are handled or processed, the exposing walls shall have explosion resistance in accordance with good engineering practices. Typically, the design includes explosion/blow-out provisions incorporated into the roof. Noncombustible construction is an assembly, such as a wall, floor, ceiling or roof having components of noncombustible material (e.g. sheet metal, steel, etc.). An assembly of non combustible materials may provide protection from direct flame impingement, but may provide very little protection from heat transfer. Noncombustible materials may decompose rapidly by melting. There is not a minimum fire resistive rating. The rating depends upon the location. If the process equipment or storage tank is beyond the minimum setback distance, combustible construction maybe used. Fire resistive is the characteristic to withstand fire and give protection from it. Fire resistance is defined in terms of hours: 1 hr., 2 hr., 3 hr., and 4 hr. This rating indicates the approximate time period that the components will withstand a fire and maintain their integrity. Robert Benedetti, NFPA Flammable Liquids Engineer, has stated that the fire resistive or noncombustible construction provisions only apply when specifically required. The standard does not mean to imply that at a minimum the building must be constructed of noncombustible material.
Electrical	Electrical area classification complying with NEC Article 514, ILHR 16 and NFPA 30 Table 5-9.5.3. Electrical emergency shut-off in exterior locked cabinet, or in adjacent building if 24 hour access. Under normal situations and proper ventilation provisions, the electrical classification of the hazardous areas within a remediation building will be Class I, Division 2. Reclassification of a “hazardous” area to a “non hazardous” area can not be achieved by monitoring or increasing the ventilation. Monitoring and auto shut-down could modify a Division 1 classification to a Division 2 classification, but not reclassify a Class I to a Class II.
Ventilation	NFPA 30-5-3.4. Natural gravity or mechanical ventilation capable of maintaining a minimum 1 CFM/ft^2 at 18” AFF. Areas that may pose temperatures above the flash point of the liquid shall be ventilated at a rate sufficient to maintain the concentration of vapors within the area at or below 25% of the lower flammable limit.

Tank construction	UL or similar listing for product contained within.
Tank located inside of building	Vessels larger than 60 gallon capacity. NFPA 30-4-4.2.7 requires containment equal to the capacity of the largest storage vessel within the area. Breach in floor for plumbing must also be designed or sealed against seepage. Tank must be vented to the outside. Double wall tanks may be used in place of building constructed containment.
Tank located outside of building	Secondary containment by dike, remote impounding or double wall tank. Protection against collision provided if in traffic area.
Product and vapor piping	All piping and joint compounds shall be compatible with the product. Piping venting the flammable or combustible storage tank shall be of steel or approved metal construction only.
Drum storage inside of building	Inside storage of drums containing Class I or II liquid product resulting from the remediation process is not recommended, but is not prohibited if the walls and ceiling are of 1 hr. fire resistive rating. Drums that are being filled must have adequate venting to prevent excessive pressure from rupturing the container.
Drum storage outside of building	Drums shall be stored in compliance with NFPA 30-4-7 Outdoor Storage.
Signage	NFPA 704 placard. (This is the diamond with four-quadrant marking.) WARNING – No Smoking. 24 hour notification number.
Notification	Notice to local fire department of installation, including name, address and telephone number(s) for 24 hour notification. Identify 24 hour access to building or exterior locked panel, and shut-down process.
Retroactivity	Non complying electrical, non complying interior ventilation, non complying tank venting, signage, and fire department notification.

Plan review

Contact local authorities to determine the scope of local plan review and permits.

Tank plan review - ILHR 10 requires that the installation of tanks for the storage of flammable and combustible liquids be submitted for plan review and conditional approval. The Department has implemented a network of Local Program Operators (LPOs) across the state authorized to conduct plan review. A LPO guide book can be obtained by calling (608) 266-7874. Contact the local fire department to identify the LPO for the respective area.

The building may or may not require plan review. The tank system will always be required for plan review and installation inspection by a LPO. The tanks associated with remediation processes *are not* required to be registered.

The LPO reviewer is instructed to note and contact a Commerce representative when plans or on-site inspection reflect that the building may be over-built for the intended remediation use. Characteristics such as footings, overhead garage doors, floor area, windows, construction material, drains and plumbing, additional utility connections, surface improvements, etc. are subject to question and justification.

Common remediation buildings are a windowless single story structure on a floating cement slab, less than 200 sq. ft., with a single walk-through door.

Tank installation
The installation of the product storage tank and the associated product and vent piping, must be supervised by an ILHR 10 Certified AST Installer. This applies only to the product and vent plumbing associated with the tank.

Remedial buildings under the PECFA program
The remedial buildings are eligible costs for reimbursement under the PECFA program. To be an eligible cost the building must be designed and constructed only large enough to house the remedial equipment and space available to service the equipment installed. The building should be designed and built according to the code without any extra amenities, such as extra windows or entrances. The remedial building would have to be bid according to ILHR (COMM) 47.33.

A PECFA Grant Reviewer will ask for the building plans when there appears to be an obvious discrepancy in the cost for the building. In reviewing the plan, if it is decided that the building was over-built for it's ultimate use, the cost for the building would be a non-eligible cost under the fund. If a municipality has an ordinance that a building must contain certain building materials or conform to a specific style, send a copy of the ordinance with the invoice for the remedial building at the time of claim submittal. The remedial building must be designed and built by the code, with consideration of reasonable cost.

ILHR (COMM)47 DISPOSAL OF REMEDIAL BUILDINGS

ILHR 47.37 DISPOSAL OF REMEDIAL EQUIPMENT AND MATERIALS PURCHASED THROUGH PECFA. (1) GENERAL. If materials or an equipment item, which was purchased and reimbursed for through the PECFA fund, is no longer required at the site, the item or material shall be sold and the funds returned to the PECFA fund for deposit to the segregated account for the payment of claims.

(2) SALE OF REMEDIAL EQUIPMENT OR MATERIALS. The sale of remedial equipment or materials no longer required shall be accomplished as follows:

(a) The claimant shall obtain the best available bid for the equipment item or materials;

(b) The claimant shall submit the bid price obtained and the original purchase price of the item to the PECFA program for authorization to sell; and

(c) The department may, after review of the bid, determine that the sale may be completed. A check payable to the department, indicating that it is from the sale of remedial equipment or materials, shall be provided to the department for deposit to the segregated account.

(d) If the bid price is not at fair market value or for any other reason not acceptable to the department, the department may at its discretion take possession of the equipment or materials for disposal through government surplus sale.

(e) The department, at its discretion, may publish a listing of remedial equipment or materials available for use at remediation sites. The department may require the use of this equipment or materials rather than the purchase of new materials and equipment for a remediation.